

**Abstract ID :** 971

**Title :** Mortality sensitivity in life-stage simulation analysis: A case study of Southern sea otters

**Category :** Conservation

**Student :** Not Applicable

**Preferred Format :** Oral Presentation

**Abstract :** Currently, there are no generally recognized approaches for linking detailed mortality and pathology data to population-level analyses of extinction risk. We used a combination of analytical and simulation-based analyses to examine 20 years of age and sex specific mortality data for Southern sea otters and apply results to project the efficacy of alternative conservation strategies. Population recovery of the southern sea otter has been slow ( $\lambda = 1.05$ ) compared to other recovering populations ( $\lambda = 1.17-1.20$ ) and between 1995 and 1999 the population actually declined ( $\lambda = 0.975$ ), apparently due to increased mortality. In this paper, we evaluate the potential population-level impacts of several putative sources of mortality on southern sea otters and identify key information gaps that can be resolved in the ongoing necropsy and salvage programs. We first present a simple demographic model and conduct elasticity analysis to examine the effects of proportional changes in vital rates on the population growth rate ( $\lambda$ ). The elasticity values obtained for Southern sea otters indicate that the population is far more sensitive to changes in survival rates (particularly adult survival) compared to reproduction. We then develop a model based on death assemblage, pathology, and live population census data to examine the sensitivity of sea otter population growth to different sources of mortality (e.g., trauma, disease, fisheries, gun shot, mating trauma, shark bites). We use resampling simulations to generate random combinations of vital rates for a large number of matrix replicates, and draw on these to estimate potential effects of mortality sources on population growth ( $\lambda$ ). Our analyses suggest management actions that are likely and unlikely to promote recovery of the southern sea otter, and more broadly indicate a methodology to better utilize cause-of-death data in conservation decision-making.